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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,036	08/29/2006	Koji Katano	128477	5830

25944 7590 06/09/2011

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1726	

NOTIFICATION DATE	DELIVERY MODE
06/09/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/591,036	KATANO, KOJI	
	Examiner	Art Unit	
	CYNTHIA LEE	1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 March 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5,6,8 and 10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5,6,8 and 10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

This Office Action is responsive to the amendment filed on 3/23/2011. Claims 1, 3, 5, 6, 8, 10 are pending. Applicant's arguments have been fully considered and are not persuasive. Claims 1, 3, 5, 6, 8, 10 are finally rejected for reasons stated herein below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 5, 6, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iio (US 2003/0027024) in view of Yamanashi (US 6632552).

Regarding claims 1 and 6, Iio discloses a control apparatus and a method for a fuel cell including an oxidizing gas supplying unit 7 configured to supply an oxidizing gas to a cathode via an oxidizing gas supply line of the fuel cell, and a hydrogen supplying unit 4 configured to supply hydrogen to an anode via a hydrogen supply line of the fuel cell, the anode having a buildup of impurities (nitrogen, carbon dioxide, [0035]) over time causing a presence of residual gas, the control apparatus comprising:

a target hydrogen partial pressure determining unit configured to dynamically calculate [0078] a target hydrogen partial pressure regarding a hydrogen pressure

among a gas mixture in the anode (nitrogen, carbon dioxide, [0035]), the dynamic calculation being based on a required electricity generation amount [0080],

a hydrogen supply pressure calculating unit configured to calculate a hydrogen supply pressure of hydrogen to be supplied to the fuel cell based on the calculated target hydrogen partial pressure [0080]; and

a hydrogen supply control unit 10 configured to regulate the supply of hydrogen from the hydrogen supplying unit to the fuel cell at the calculated hydrogen supply pressure [0032].

Regarding claims 1 and 6, Iio does not disclose a cathode-side gas pressure detecting unit configured to detect a cathode-side gas pressure within at least one of the oxidizing gas supply line and the cathode;

the dynamic calculation being based on the detected cathode- side gas pressure;

a hydrogen supply pressure calculating unit configured to calculate a hydrogen supply pressure of hydrogen to be supplied to the fuel cell based on the detected cathode-side gas pressure,

and the method performing the abovementioned functions.

Regarding claims 1 and 6, Yamanashi teaches that the compressor for the air, the reformer for the fuel, the air flow control valve, and the hydrogen control valve are controlled such that the pressures at the anode side and the cathode side of the fuel cell stack and the pressure difference between the anode side and the cathode side do not exceed the allowable limits to prevent an electrolytic membrane from being ruptured. This control is repeatedly carried out at successive sampling intervals (4:30-35). It

would have been obvious to one of ordinary skill in the art at the time the invention was made to dynamically control and calculate the anode supply of Iio based on the cathode air pressure for the benefit of not exceeding the amount of air required by the fuel cell.

Regarding claims 5 and 10, Iio discloses an exhaust unit 61 configured to discharge residual gas remaining within the anode and the hydrogen supply line;

an exhaust control unit configured to discharge the residual gas using the exhaust unit when the hydrogen supply pressure is not within a tolerance range for gas pressure on the anode side [0038, 0039]; and

a residual gas partial pressure calculating unit 44 configured to calculate a partial pressure of the residual gas remaining within the anode and the hydrogen supply line when the residual gas is discharged [0040], wherein

the hydrogen supply pressure calculating unit calculates the hydrogen supply pressure of the hydrogen to be supplied to the fuel cell based on the calculated target hydrogen partial pressure and the calculated residual gas partial pressure [0040].

Iio modified by Yamanashi teaches the hydrogen supply pressure calculating unit calculates the hydrogen supply pressure of the hydrogen to be supplied to the fuel cell based on the detected cathode-side gas pressure.

Iio discloses that when the hydrogen concentration in the anode effluent recirculation passage 8 is lower than the predetermined concentration, the hydrogen pressure is also lower than a predetermined pressure [0038]. Thus, it is noted that Iio discloses of measuring the residual gas concentration or the residual gas partial pressure.

Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iio (US 2003/0027024) in view of Yamanashi (US 6632552) as applied to claim 1 or 6, further in view of Motozono (US 6638652).

Iio modified by Yamanashi teaches all the elements of claims 1 and 6 and are incorporated herein. Iio modified by Yamanashi discloses the hydrogen supply pressure calculating unit calculates the hydrogen supply pressure of the hydrogen to be supplied to the fuel cell based on the detected cathode-side pressure.

Iio modified by Yamanashi does not teach an apparatus having a fuel cell temperature detecting unit configured to detect a temperature of the fuel cell; and

a correcting unit configured to correct the calculated target hydrogen partial pressure based on the detected temperature of the fuel cell to yield a corrected target hydrogen partial pressure, wherein

the hydrogen supply pressure calculating unit calculates the hydrogen supply pressure of the hydrogen to be supplied to the fuel cell based on the corrected target hydrogen partial pressure,

and a method performing the abovementioned functions.

Motozono teaches the power generation efficiency of these fuel cells varies with the temperature or humidity of the electrolyte, and the output increases depending on the supply amount of the fuel gas and oxidizing gas, and therefore in order to produce a required electric quantity efficiently, it is important to control the running conditions

and the supply gas amounts (1:33-38). It would have been obvious to one of ordinary skill in the art at the time the invention was made to correct and calculate the supply of the hydrogen gas, or the oxidant gas, or both, based on the operating temperature of the fuel cell of Iio modified by Yamanashi for the benefit of efficiently generate electrical power.

Response to Arguments

Applicant's arguments filed 3/23/2011 have been fully considered but they are not persuasive.

Applicant asserts Iio imperfectly describes this process where it discusses an "optimal hydrogen pressure" at, for example, paragraph [0083]. All of the control methodology conducted in Iio has to do with determining a target hydrogen partial pressure, and maintaining some sense by which to adjust the actual hydrogen partial pressure to achieve the target. There is no manner by which Iio calculates a hydrogen supply pressure of hydrogen to be supplied to the fuel cell based on the calculated target hydrogen partial pressure. Rather, Iio modifies the actual hydrogen partial pressure to be supplied to the fuel cell when the actual hydrogen partial pressure is not equal to the target hydrogen partial pressure. Iio is in no way concerned with calculating a hydrogen supply pressure to be supplied to the fuel cell based on the calculated target hydrogen partial pressure and the detected cathode-side gas pressure. Pg. 3 of Response.

In response, it is noted that what the Applicant refers to as "actual hydrogen partial pressure" to be supplied to the fuel cell reads on Applicant's "hydrogen supply pressure" because the hydrogen is supplied to the fuel cell. Iio discloses of calculating a hydrogen supply pressure to be supplied to the fuel cell based on the calculated target hydrogen partial pressure and because Iio discloses that a target hydrogen partial pressure is calculated in response to the load [0080]. Further, Yamanashi teaches of supplying the reactant gases with respect to the pressures of the anode side, the cathode side, and the pressure difference between the anode and cathode (4:30-35).

Applicant asserts that the control unit 10 in Iio is not configured to regulate the supply of hydrogen from the hydrogen supplying unit to the fuel cell at the calculated hydrogen supply pressure. Rather, the control unit 10 in Iio, as discussed above, is configured to regulate the hydrogen partial pressure on the post- separation side 11B of the membrane hydrogen separator 11 to coincide with a determined target hydrogen partial pressure based on manipulating valves on that side of the membrane airborne hydrogen separator 11 in the Iio device (emphasis in original). Pg. 4 of Response.

In response, it is noted that the hydrogen partial pressure is contributed by the reformer 4, and thus the calculation of the hydrogen supply pressure would be from the reformer 4, or the hydrogen supplying unit. Further, the valve 45 that is controlled by the control unit 10 is connected to the reformer 4, and also contributes to adjust the hydrogen partial pressure.

Applicant states it is unclear how the Office Action asserts that simply maintaining pressures on both sides of a membrane in Yamanashi at a level so as to not rupture the membrane can reasonably be considered to be made to augment the target hydrogen partial pressure determination of Iio based on a required electricity amount. It is also unclear how any cathode-side gas pressure detection disclosed in Yamanashi could be forced into a target hydrogen partial pressure calculation based on a load as disclosed as Iio. Further, it is unclear how the Iio device would then be, in a modified manner, made capable of adjusting its actual hydrogen pressure based on such a detected cathode-side gas pressure. The methodology described in Iio is specific and complex. It relies, however, on distinct inputs that make no room for adjustment by inclusion of another input such as measurement of a cathode-side pressure, which is disclosed by Yamanashi. Pg. 5 of Response.

In response, Iio discloses of determining the target hydrogen partial pressure based on the required electricity amount. Refer to [0080] of Iio.

Regarding Yamanashi, it is noted that adjusting the hydrogen and oxygen based on the anode side pressure, cathode side pressure, and the pressure difference between the anode and cathode would allow for the adjustment of the hydrogen partial pressure of Iio depending on the load because Yamanashi teaches that both the air control valve and hydrogen control valve are regulated at respective flow rates to be supplied to the fuel cell such that it produces electric power output demanded by the

operating conditions (emphasis added, 3:25-30). And as such, the modification of lio is proper in light of Yamanashi.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA LEE whose telephone number is (571)272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-12922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Primary Examiner, Art Unit 1726